

35. The apparatus of claim 34, wherein at least one of the first opening and the second opening is formed at a periphery of the pixel electrode.

36. The apparatus of claim 34, wherein the narrowed portion comprising the first correction site extends parallel to the first gate line.

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### **REMARKS**

Reexamination of the captioned application is respectfully requested.

#### **A. SUMMARY OF THIS AMENDMENT**

By the current amendment, Applicants basically:

1. Supply a new Abstract pursuant to the Examiner's request.
2. Editorially amend the specification.
3. Amend claims 1, 3 - 6, 8 - 11, 13 - 15, and 17.
4. Respectfully traverse the objection to the drawings (see section E infra).
5. Respectfully traverse all rejections (see section D infra).
6. Add new independent claim 18 and claims 20 - 26 dependent thereon, new independent claim 28 and new claims 29 - 31 dependent thereon; and new independent claims 32 - 34 (with new claims 35 - 36 dependent upon new independent claim 34).

#### **B. AMENDEMENTS TO THE CLAIMS**

The amendments to the claims are shown in the attached Appendix. Of specific note is that the amended independent claims 1, 6, 11, and 15 no longer require an intersecting arrangement of the transmission lines, and that the interlayer insulating film is disposed so as to at least partially cover the data/scan signal transmission lines and the transistor.

Dependent claims 4 and 9 have been amended to specify that the drain electrode (claim 4) and the gate electrode (claim 9) comprises a “potential correction site” (terminology which replaces the “to-be-corrected portion”) which has a narrowed width. The specification has also been amended, e.g., to equate “potential correction site” to the “to-be-corrected portion”.

Independent claim 17 has been amended to simply state, in its last paragraph limitation, that the pixel electrode has an opening to expose a potential correction site of the liquid crystal display apparatus.

### **C. THE NEW CLAIMS**

New independent claim 18 requires an opening formed in the pixel electrode to expose a potential correction site provided therebeneath. New independent claim 18 is supported, e.g., by openings c and d in pixel electrode 235 shown, e.g., in Fig. 4. The new claims 20 – 27 dependent thereon are supported, e.g., in view of the original claims.

New independent claim 28 resembles new independent claim 18, but further specifies that an interlayer insulation film is generally formed beneath the pixel electrode but not beneath the opening which exposes the potential correction site. For support, see, e.g., text surrounding and including the first full paragraph on page 57 of the specification.

New independent claim 32 is supported, e.g., by Figs. 8 and 9. New independent claim 33 is supported, e.g., by Figs. 10 and 11. New independent claim 34 is supported, e.g., by Figs. 13 and 14.

### **D. THE CLAIMS ARE DEFINITE**

The office action alleges that “it is unclear how the liquid crystal layer can be disposed so as to overlie at least part of the drain electrode (claim 1), the gate electrode

(claim 6), and the diverted portion of the auxiliary capacitance line (claim 11).” The Examiner observes that, in the drawings, “the liquid crystal layer overlies entirely the active matrix substrate....”

There is no lack of clarity. The language of the claim is definite and clear: overlying “at least part” encompasses both the case of partial overlayment and the case of complete overlayment.

Moreover, insofar as enablement and written description may be at issue, Applicant takes the position that Applicant’s illustration and disclosure of an interlayer insulating film which entirely covers the data/scan signal transmission lines and the transistor indeed supports the claim language of at least partial coverage. A complete coverage is, indeed, at least partial coverage. If a cloud overlies all of the Commonwealth of Virginia, it can be truly said that the cloud overlies at least part of the Commonwealth of Virginia. Should the Examiner be of a contrary inclination, a citation of specific authority would be appreciated.

If the Examiner’s reasons for allowance is incompatible with this rationale, then it is respectfully submitted that the reasons for allowance should be reconsidered and/or reworded.

The rejection to independent claim 17 is deemed moot in view of the amendment thereto (see the last paragraph of section B, supra).

#### **E. THE DRAWINGS SHOW THE CLAIMED FEATURES**

The drawings have been objected to under 37 CFR § 1.83(a) as allegedly not showing every feature of the invention specified in the claims. This objection is respectfully traversed. As amended, the interlayer insulating film is recited as disposed

“to at least partially cover”, and (as pointed out above) the interlayer insulating film and the liquid crystal layer “overlie at least part” of the structure as claimed.

Therefore, akin to the rationale articulated in section D, supra, Applicant submits that illustration in the drawings of an entire covering encompasses illustration of “at least partial covering”, since an entire covering is certainly an “at least partial covering.” Accordingly, no proposed drawing changes are necessary, nor are any submitted. Again, should the Examiner be of a contrary inclination, specific authority should be cited.

#### **F. MISCELLANEOUS**

In view of the foregoing and other considerations, all claims are deemed in condition for allowance. A formal indication of allowability is earnestly solicited.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page(s) is captioned "Version With Markings To Show Changes Made."

The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.


Should the Examiner feel that an interview with the undersigned would facilitate allowance of this application, the Examiner is encouraged to contact the undersigned.

**KASAHARA et al**  
Serial No. **09/388,605**

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE SPECIFICATION**

*Please replace the paragraphs beginning at page 1, line 9 through page 2, line 13, with the following rewritten paragraphs:*

Generally [as electrodes of] a liquid crystal display apparatus with switching elements [are] is provided with an auxiliary capacitance electrode [for formation of] which comprises an auxiliary capacitor, as well as pixel electrodes for use in driving pixels [to drive] of a liquid crystal layer. In the case where such pixel-driving pixel electrode is disposed via an interlayer insulating film on the pixels, an underlying auxiliary capacitance electrode is provided due to the fact that thickness of the interlayer insulating film is large.

[Herein,] Fig. 28A is a view showing a plan view of one example [exemplary] of the liquid crystal display apparatus mentioned above, whereas Fig. 28B is a partial sectional view showing a thin-film transistor (TFT) for use as a switching element in the liquid crystal display apparatus as shown in Fig. 28A. The liquid crystal display apparatus of such a constitution has been disclosed for example, in Japanese Unexamined Patent Publication JP-A 9-152625.

In Figs. 28A and 28B [is provided] a TFT 124 is provided on a substrate 131, and an underlying electrode 125 is formed so as to connect to a drain electrode 136b of this TFT 124. This underlying electrode 125 may sometimes be called a "drain electrode" in the case where it is made integral with the drain electrode 136b. An interlayer insulating film 138 is so formed as to overlay this structure, and pixel electrodes 121 formed thereon are electrically connected to the underlying electrode 125 via a contact hole 126 that is provided in the interlayer insulating film 138.

*Please replace the paragraph beginning at page 3, line 1 through line 10, with the following rewritten paragraph:*

In the active matrix substrate having the switching element formed thereon, [may be generated] defects may be generated during manufacturing processes [thereof, which]. The defects [would] may result in creation of unwanted display defects or image visualization failures including, but not limited to, line defects, inadvertent bright dots, and flicker. For this reason, there have been proposed and developed a variety of defect repairing techniques in order to increase production yields, and one or a combination of a plurality of defect repairing techniques has been implemented.

*Please replace the paragraph beginning at page 3, line 16 through page 4, line 2, with the following rewritten paragraph:*

More specifically, as shown in Figs. 29A, 29B, [let] suppose a gate electrode 420 [that is diverted from the scan signal transmission line 402 be] has been cut [for separation] and thus separated from the scan signal transmission line 402, by use of a laser beam. Thereafter, [perform] as the repairing technique laser irradiation is aimed at specified positions shown by arrows Y, Z, from either the top surface or bottom surface of a substrate [used]. [This] The irradiation permits a source electrode 421 and drain electrode 422 to be electrically shorted together via the gate electrode 420 that has experienced the laser-cutting process. This electrical shorting results in application of an average voltage potential of data signals to the pixel electrode 406, which in turn reduces or minimizes recognizability of defects.

*Please replace the paragraph beginning at page 4, line 9 through page 5, line 1, with the following rewritten paragraph:*

However, this reflection type defect repairing technique, which is [the one that is] designed for repair of defects occurring in the manufacturing processes, [by irradiating] irradiates a substrate 430 shown in Fig. 30 with laser light or beam at a portion to be corrected, from the bottom surface of the substrate, [to thereby cut] thereby cutting and

[blow] blowing the to-be-corrected portion away from the substrate. This approach is inherently faced with a problem that cracks or "infractions" can occur in the interlayer insulating film 434 during the laser irradiation[, which]. Such cracks would result, when the pixel electrode 435 overlies the to-be-corrected portion, in undesired projection of such overlying pixel electrode 435 toward a liquid crystal layer 454 together with the cracked interlayer insulating film 434. This projected pixel electrode 435 badly behaves to deform and come into contact with an opposed or "counter" electrode 451 and/or the cross-section of the to-be-corrected portion thus letting different signal transmission lines be electrically shorted together, which leads to creation of secondary defects.

*Please replace the paragraph beginning at page 29, line 6 through page 30, line 7, with the following rewritten paragraph:*

A semiconductor layer 223 is provided at a formation part of the TFT 24 overlying the gate insulation film 240, on which layer two contact layers 224A, 224B are formed in such a manner that these are separated on the semiconductor layer 223. Provided thereon is the source electrode 221 which partly overlaps one contact layer 224A while the drain electrode 222 is provided partly overlapping the other contact layer 224B. As shown in Fig. 3 the source electrode 221 is so provided as to be diverted from the data signal transmission line 201. [Here, in] In view of the fact that an edge of the drain electrode 222 on the side of the scan signal transmission line 202 is such that the gate insulation film 240 is present between the scan signal transmission line 202 and drain electrode [202] 222, [let it] the drain electrode 222 [overlap] overlaps the scan signal transmission line 202. [At this time, an] An auxiliary capacitor section is formed at the overlap portion with the scan signal transmission line 202, i.e. the neighboring scan signal transmission line which is used for use in sending forth a gate signal at one-prior timing than another scan signal transmission line 202 to which the TFT 24 including this drain electrode 222 is connected. This auxiliary capacitor section is arranged to have what is called the "Cs on-gate/normally black" structure. On the other hand, a side edge of the drain electrode



222 facing the data signal transmission line 201 is such that the drain electrode 222 is formed at the same level as the data signal transmission line 201 at the same process step[; thus,] Thus, [let it be] this side edge of drain electrode 222 is spaced apart from the data signal transmission line 201 at a distance [for elimination of] which eliminates any possible electrical short-circuiting.

*Please replace the paragraph beginning at page 31, line 16 through page 32, line 16, with the following rewritten paragraph:*

The drain electrode 222 is formed into a planar shape shown in Fig. 3. More specifically, the drain electrode 222 has a recess portion 222A which is continuous from the outer edge thereof up to the inside. Provision of the recess 222A permits the drain electrode 222 to constitute a single conductive path. In the description an edge side of the drain electrode 222 which overlaps the contact layer 224B is assumed as the upstream of such conductive path while letting the other edge side of drain electrode 222 overlapping the scan signal transmission line 202 be assumed as the downstream of the conductive path. The contact hole 226 is placed at a midway portion of the drain electrode 222 that constitutes a single conductive path for allowing the pixel electrode 235 and drain electrode 222 to be electrically connected together via the contact hole 226. Here, such part whereat the electrical connection is made will be referred to as an electrical connection section D. The drain electrode 222 has to-be-corrected portions (e.g. potential correction sites) *a*, *b*, one of which positions is on the conductive-path upstream side which is on the TFT 24 side of the electrical connection section D and the other of which is in downstream of electrical connection section D. Note here that the requisite number of such to-be-corrected portions is determinable so that one or more to-be-corrected portions may be provided at each of the conductive-path upstream side and downstream side. In the embodiment 1, the to-be-corrected portion is a neck portion of the drain electrode, having a width narrower than that of the other portions thereof.

*Please replace the paragraph beginning at page 33, line 6 through line 15, with the following rewritten paragraph:*

The pixel electrode 235, as shown in Fig. 4, is formed to have openings *c*, *d* at those portions of the pixel electrode 235 overlying the to-be-corrected portions *a*, *b* of the drain electrode 222, wherein the openings *c*, *d* may be holes or cutaways each being the same in area as each to-be-corrected portion *a*, *b*. Although apparatus design schemes permit the openings *c*, *d* to be substantially the same in area as the underlying to-be-corrected portions *a*, *b*, actual implementation requires them to be greater in area than to-be-corrected portions *a*, *b* for [preparation of] allowing some margins in the manufacture thereof.

*Please replace the paragraph beginning at page 36, line 15 through line 24, with the following rewritten paragraph:*

Further, as shown in Fig. 5, in case the thickness of the interlayer insulating film 234 approximates in value [to] the thickness of liquid crystal layer 254, any one with the drain electrode 222 at the repair portion attached to fragments of the interlayer insulating film 234 at the repair portion will hardly behave to fly out into the liquid crystal layer 254 and thus continue residing at a cutout portion and then return to its original position due to application of vibrations and pressures thereto, which possibly results in occurrence of re-leakage of the cutout portion.

*Please replace the paragraphs beginning at page 39, line 5 through page 40, line 16, with the following rewritten paragraphs:*

Correction of this liquid crystal display apparatus of the normally-white mode will be explained on the basis of Table 1 above. In case a defect as found during test/inspection procedures is an electrical shorting between the gate electrode 220 and drain electrode 222 at the point A of the TFT 24 of Fig. 3, a repairing method as has been

disclosed in JP-B2 3-55985 is used to perform the intended repair[, which method is designed including]. That method includes the steps of cutting the gate electrode 220 for separation from the scan signal transmission line 202, and then letting the source electrode 221 be electrically shorted with drain electrode 222. This is the repairing method #1 indicated in Table 1. [Whereby,] In repairing method #1, a voltage of the average potential of data signals involved is [being] constantly applied to the pixel electrode 235 in any event[s] to ensure that a defective pixel electrode stays less in visual recognition relative to its surrounding portions.

In case the drain electrode 222 and scan signal transmission line 202 are electrically shorted together at the point C in the downstream of the conductive path of the electrical connection section D, [cut for separation] the downstream to-be-corrected portion *b* is cut and simultaneously [perform] repair is performed by the repairing method #1. This makes it possible to cut and separate the pixel electrode 235 from the scan signal transmission line 202 resulting in application of a voltage of the average potential of data signals, which in turn causes a defective pixel electrode to decrease in visual recognition relative to its surrounding ones. Alternatively, where both the TFT 24's point A and its downstream point C are shorted, [cut for separation] the downstream to-be-corrected portion *b* is cut while at the same time performing repair using the repairing method #1. Still alternatively, when the pixel electrode 235 is shorted with its neighboring pixel electrode 235 at point B as shown in Fig. 4, [cut one] to-be-corrected portion *a* in the upstream of the drain electrode is cut as connected to the pixel electrode 235. If both the upstream point B and downstream point C are shorted, then [cut] the upstream and downstream to-be-corrected portions *a*, *b* are cut for separation.

*Please replace the paragraph beginning at page 40, line 23 through page 41, line 3, with the following rewritten paragraph:*

Whereas the embodiments 1, 2 stated above are arranged to have the "Cs on Gate" structure with the auxiliary capacitor formed on a one-order proceeding scan signal

transmission line, [an] embodiment 3 is directed to the case where such auxiliary capacitor is formed on or over a common line that has been formed separately from the scan signal transmission line.

*Please replace the paragraph beginning at page 41, line 12 through page 42, line 1, with the following rewritten paragraph:*

Fig. 8 illustrates a plan view of one pixel part of the liquid crystal display apparatus including a TFT, drain electrode, data signal transmission line, and scan signal transmission line[;]. Fig. 9 is a similar plan view with depiction of a pixel electrode added thereto. Fig. 7 is a sectional diagram of the liquid crystal display apparatus in accordance with the third embodiment. The embodiment 3 is arranged so that a common line 300 for auxiliary capacitance is provided independently of the scan signal transmission line 202 and is formed to oppose the drain electrode 222 thereby providing what is called the "Cs on Common" structure. In the drain electrode 222 of the embodiment 3, its downstream-side to-be-corrected portion *b* is disposed between an electrical connection section D and the auxiliary capacitance common line 300. The remaining arrangements are similar to those in the embodiment 1.

*Please replace the paragraphs beginning at page 42, line 10 through page 43, line 3, with the following rewritten paragraphs:*

In case the gate electrode 220 and drain electrode 222 are electrically shorted together at the point A of TFT 24 resulting in malfunction of the TFT 24 as shown in Fig. 7, [cut] the upstream to-be-corrected portion *a* is cut. [Whereby,] Thereby the pixel electrode 235 is separated or disconnected from the drain electrode 222 to be in the electrically floating state and then set in the turn-off state, thus enabling reduction or minimization of visual recognition of a defect on the display screen.

Where the drain electrode 222 and common line 300 are shorted together at the point C in the downstream of a conductive path of the electrical connection section D, [cut] the downstream to-be-corrected portion *b* is cut. Alternatively, when a pixel electrode 235 and its neighboring pixel electrode 235 are shorted at the point B as shown in Fig. 8, [cut] the upstream to-be-corrected portion *a* of the drain electrode 222 that is connected to both pixel electrodes is cut. Still alternatively, when both the TFT 24's point A and the downstream point C are shorted, and further when the points A-C are all shorted, [cut] both of the upstream and downstream to-be-corrected portions *a* and *b* are cut.

*Please replace the paragraphs beginning at page 43, line 21 through page 45, line 5, with the following rewritten paragraphs:*

In the case where a defect as found during test/inspection procedures is due to an electrical shorting between the gate electrode 220 and drain electrode 222 at the point A of the TFT 24 of Fig. 7, the repairing method as has been disclosed in JP-B2 3-55985 is used to perform the intended repair[, which]. That method [is designed including] includes the steps of cutting the gate electrode 220 in its non-formation region *e* for separation from the scan signal transmission line 202, and then letting the source electrode 221 be electrically shorted with drain electrode 222. This is the repairing method #1 indicated in Table 1. [Whereby,] Thereby, a voltage of the average potential of data signals concerned is being constantly applied to the pixel electrode 235 to thereby ensure that a defective pixel electrode stays less in on-screen visual recognition relative to its surrounding portions.

In case the drain electrode 222 and common line 300 are electrically shorted together at the point C in the downstream of the conductive path of the electrical connection section D, [cut for separation] the downstream to-be-corrected portion *b* is cut and [simultaneously perform] repair is simultaneously performed by the repairing method #1. This makes it possible to cut and separate the pixel electrode 235 from the common

line 300 resulting in application of a voltage of the average potential of data signals to the pixel electrode, which in turn lets a defective pixel electrode be hard to be visually recognized relative to its neighbors.

Alternatively, when the pixel electrode 235 is shorted with its neighboring pixel electrode 235 at point B as shown in Fig. 8, [cut] one to-be-corrected portion *a* in the upstream of the drain electrode 222 is cut as connected to one pixel electrode.

Still alternatively, where both the TFT 24's point A and its downstream point C are shorted, [cut for separation] the downstream to-be-corrected portion *b* is cut while at the same time performing repair using the repairing method #1. If both the upstream point B and downstream point C are shorted then [cut] the upstream and downstream to-be-corrected portions *a*, *b* are cut for separation.

*Please replace the paragraph beginning at page 45, line 12 through line 19, with the following rewritten paragraph:*

A liquid crystal display apparatus in accordance with an embodiment 5 is of the so called "Cs on Common" type that is operable in the normally white mode, a repairing method of which will be explained in conjunction with Figs. 10 and 11 along with Table 1 above. The liquid crystal display apparatus of [the] embodiment 5 is similar in structure to [the] embodiment 3 with the active matrix substrate being modified as shown in Figs. 10-11.

*Please replace the paragraph beginning at page 45, line 20 through page 46, line 5, with the following rewritten paragraph:*

In [the] embodiment 5 the TFT 24 is formed overlying the scan signal transmission line 202 in order to improve the aperture ratio. More specifically, this embodiment is designed to have the "TFT on Gate" structure. A common branch 301 is diverted from the common line 300 whereas a data branch 2011 is diverted from the data

signal transmission line 201. With respect to the common branch 301, the data branch 2011 and drain electrode 222 are laminated over each other with a gate insulation film 240 sandwiched between them. This embodiment is the same in arrangement as the embodiment 3 except that the structure above is employed and that its display is in the normally white mode.

*Please replace the paragraph beginning at page 46, line 6 through line 20, with the following rewritten paragraph:*

The pixel electrode 235 is so formed as to have an opening  $f$  at a specified location overlying an edge portion of the common branch 301 on the side of the common line 300, which opening may be either a hole or a cutaway. An interlayer insulating film 234 is immediately beneath the opening  $f$  on the common branch and is formed to have a hole or cutaway portion in a non-formation region  $g$  which is the same in area as the non-formation region  $f$ . Although the interlayer insulating film 234 may be formed in the non-formation region  $g$  on the common branch as in the non-formation region on the to-be-corrected portions  $a, b$ , fabrication of such film is preferably eliminated. [It will be recommended that] Preferably the structure above is laid out as closely as possible to the electrical connection section D to ensure that the to-be-corrected portions  $a, b$  are useable for repair even when these are separated from each other.

*Please replace the paragraph beginning at page 46, line 25 through page 47, line 16, with the following rewritten paragraph:*

In case a defect as found at test/inspection steps is due to an electrical shorting between the gate electrode 220 and drain electrode 222 at the point A of the TFT 24 of Fig. 10, the repairing method as has been disclosed in JP-B2 3-55985 is used to perform repair[, which]. That method [is designed including] include the steps of cutting the common branch 301 for separation from the common line 300 at the part immediately

underlying the opening *f* and non-formation region *g* on the common branch, and then letting the data signal transmission line 201 be electrically shorted with the common branch 301 thus separated, and further letting the drain electrode 222 and the separated common branch 301 be electrically shorted together. This is the repairing method #1 indicated in Table 1. [Whereby,] Thereby, a voltage of the average potential of data signals involved is [being] constantly applied to the pixel electrode 235 in any event[s] to ensure that a defective pixel electrode remains less in visual recognition relative to its surrounding portions.

*Please replace the paragraphs beginning at page 48, line 15 through page 51, line 8, with the following rewritten paragraphs:*

In addition, a semiconductor layer 8 is provided at a TFT 7 formation portion overlying the gate insulation film 6, on which two divided contact layers 9[A, 9B] are formed overlying the semiconductor layer 8. Further provided thereon are a source electrode 10 partly overlapping one contact layer 9[A] and a drain electrode 11 partly overlapping the remaining contact layer 9[B].

As shown in Fig. 14, this source electrode 10 is provided and diverted from its associative data signal transmission line 12 whereas the drain electrode 11 is arranged overlapping, via the gate insulation film 6, a scan signal transmission line 4 disposed adjacent to a certain end of a pixel electrode opposite to the other end at which the TFT 7 is connected after completion of the liquid crystal display apparatus. [And] Moreover, an auxiliary capacitor section 17 is formed at an overlap portion of the drain electrode 11 and the scan signal transmission line 4 nearest to the opposite end--i.e. a scan signal transmission line 4 for use in sending a gate signal one before. This auxiliary capacitor section 17 is designed to have what is called the "Cs on Gate" structure. On the other hand, as the drain electrode 11 and data signal transmission line 12 are formed at the same level over the substrate at the same process step, these are formed to be spaced apart from each other for electrical short circuit elimination.



[Under the condition an] An interlayer insulating film 13 is formed to cover almost the entire surface of the substrate 3 with a contact hole 14 provided in this interlayer insulating film 13 at a specified location overlying the drain electrode 11. [And, a] A pixel electrode 15 as shown in Fig. 1, made of a chosen reflective electrode material, is provided on the interlayer insulating film 13 wherein part of this pixel electrode 15 is filled into the contact hole 14 for electrical connection with the drain electrode 11. Finally, an alignment film 16 is formed over the substrate 3 including the pixel electrode 15 to thereby complete the active matrix substrate of the embodiment 6.

Fig. 13 is a diagram showing the layout of parts or components in a one-pixel region of the active matrix substrate of the liquid crystal display apparatus, and repetitive formation of requisite components with such layout being as a unit permits fabrication of the active matrix substrate. In addition, the upper-side substrate 2 in the drawing with a liquid crystal layer 1 sealed between it and the lower substrate 3 is provided with a transparent electrode made of ITO, for example, for use as an opposed or "counter" electrode 18, on which an alignment film 19 is provided thereby constituting the counter substrate. And, [let] the liquid crystal layer 1 [be] is sandwiched between these both substrates 2, 3 to complete the illustrative liquid crystal display apparatus.

[Here, an] An explanation will be given of the drain electrode 11 of the liquid crystal display apparatus in [the] embodiment 6 with reference to the plan view diagram of Fig. 14. This drain electrode 11 has a recess portion 11A formed therein as shown in Fig. 14, thereby constituting a single conductive path. The contact hole 14 is placed at a specified position along the drain electrode 11, causing the drain electrode 11 to be electrically connected to the pixel electrode 15 via this contact hole 14. [Let the] The part for electrical connection by this contact hole 14 [be] is an electrical connection section D. In [the] embodiment 6 the drain electrode 11 is arranged to be partly narrowed in width at selected positions, thus defining to-be-corrected portions [*a*, *b*,] *b*, *a*, which positions are, respectively, in the upstream of the conductive path (drain electrode 11) on the side of TFT 7 of this electrical connection section D and [also] in the downstream of

the conductive path (drain electrode 11) of electrical connection section D. Note that the requisite number of such to-be-corrected portions  $a$ ,  $b$  is determinable so that one or more to-be-corrected portions may be provided at each of the conductive-path upstream side and downstream side.

*Please replace the paragraphs beginning at page 51, line 20 through page 54, line 13, with the following rewritten paragraphs:*

[Here, the] The various margins may include an overlap margin of TFT patterns, laser-shot repairing alignment margin, to-be-corrected portion's scattering area margin, laser shot power margin for establishment of enhanced correct abilities with increased reliability, and others. Taking account of these margin parameters, it will be desirable that the width WH of the opening  $d$  along the width of the to-be-corrected portion  $b$  of the drain electrode 11 is broader by about 1 to 30  $\mu\text{m}$  than the line width WB of the to-be-corrected portion  $b$ . Obviously, in the case where all the margins above are negligible, it will be permissible without suffering from any specific problems that the width of opening  $d$  is set identical to the line width of the to-be-corrected portion  $b$  of the drain electrode 11[; additionally] Additionally, in view of the fact that the part on the upstream side of the drain electrode 11 and part in the downstream are electrically conducted together via the to-be-corrected portion  $b$ , the line width of the to-be-corrected portion  $b$  of the drain electrode 11 may be a certain line width that will never be mechanically cut away during processes of a liquid crystal panel. Note that in the subject embodiment 6 the opening  $d$  was formed so that its size is greater by about 10 $\mu\text{m}$  than the line width of the to-be-corrected portion  $b$  of the drain electrode 11.

In regard to a width WV in a direction at right angles to the width direction of the to-be-corrected portion  $b$  of the non-pixel electrode formation section (opening)  $d$  with respect to the to-be-corrected portion  $b$  of the drain electrode 11, the width is determinable depending on both a laser irradiation area and irradiation power. By taking into consideration the laser position-alignment accuracy and scattering of the drain

electrode 11 or the like, the width may be set ranging from 5 to 50 $\mu$ m, or more or less. Obviously, in this case also, if all the margins are negligible then it is permissible that the width WV on the vertical side of the opening  $d$  be the same as the laser irradiation width[; additionally] Additionally, with regard to the shape of the opening  $d$  also, such may be a square or rectangular shape or else. From the foregoing discussions, the embodiment 6 was designed letting the opening size WH  $\times$  WV be of rectangular shape of 40 $\mu$ m  $\times$  30 $\mu$ m.

[Here, an] An explanation will be given of the to-be-corrected portions  $a$ ,  $b$  of the drain electrode 11 of the liquid crystal display apparatus in [the] embodiment 6 above. Fig. 16 depicts a plan view of a one-pixel region of an active matrix substrate of a liquid crystal display apparatus for use as a comparative example of the invention. This comparison example is such that as shown in Fig. 16, the to-be-corrected portion  $b$  of the drain electrode 11 is placed at or near the center of a pixel electrode 15. As in this example, the presence of the drain electrode 11's to-be-corrected portion near or around the center of the pixel electrode 15 can result in an opening that is greater than the drain electrode 11's to-be-corrected portion being 100% deleted from the pixel electrode 15 undesirably, which in turn leads [lines] to noticeable reduction in the resultant aperture ratio of the liquid crystal display apparatus.

To avoid this, the embodiment 6 is arranged as follows: When forming the to-be-corrected portions  $a$ ,  $b$  of the drain electrode 11, the pixel electrode's openings  $c$ ,  $d$  are laid out so that these are in contact with the outer periphery of the pixel electrode 15 as shown in Figs. 12-13. This results in part of the openings  $c$ ,  $d$  being greater in dimension than the drain electrode 11's to-be-corrected portions  $a$ ,  $b$  being formed to overlap a region in which no pixel electrodes are formed for subdivision of neighboring pixel electrodes 15 (referred to as the "pixel division region" hereinafter), the overlapping portion enabling likewise suppression of reduction of the aperture ratio. Additionally, with the embodiment 6, the pixel electrode opening was designed overlapping the pixel division region by about 50% to thereby avoid any unwanted aperture ratio reduction.

*Please replace the paragraphs beginning at page 54, line 25 through page 56, line 17, with the following rewritten paragraphs:*

Firstly, as shown in Fig. 14, in case the gate electrode 5 and drain electrode 11 are shorted together at the point A of the TFT 7 resulting in malfunction of the TFT 7, [cut] the to-be-corrected portion *a* is cut in the upstream of the drain electrode 11. [Whereby] Thereby, the pixel electrode 15 is separated and disconnected from the drain electrode 11 [to be] and is in the electrically floating state and thus acts as a turn-off or "undriven" pixel, thus enabling reduction or minimization of visual recognition of a defect on the display screen.

Similarly, where the drain electrode 11 and scan signal transmission line 4 are shorted together at a point C of the auxiliary capacitor section 17, [cut] the downstream to-be-corrected portion *b* of the drain electrode 11 is cut. Alternatively, where a pixel electrode 15 and its neighboring pixel electrode 15 are shorted together due to presence of contaminants at the point B in a region for dividing neighboring pixel electrodes 15, [cut] the upstream-side to-be-corrected portions *a* of both drain electrodes 11 of such neighboring pixel electrodes 15 are cut. Still alternatively, when both the point A of TFT 7 and the point C of auxiliary capacitance section 17 are shorted, or when all the points A-C are shorted, [cut] both the upstream and downstream to-be-corrected portions *a, b* of drain electrode 11 are cut.

In this way, [the] embodiment 6 is capable of curing or correcting any defects found during inspection, by cutting through laser irradiation the upstream to-be-corrected portion *a* or downstream to-be-corrected portion *b* of the drain electrode 11 so that any defects that can affect the on-screen display abilities such as line defects and/or bright dots or the like will no longer be visualized on the screen thus improving the manufacturing efficiency of the liquid crystal display apparatus.

[Here,] Fig. 18 illustrates in cross-section a defect repairing portion of the liquid crystal display apparatus of [the] embodiment 6. As shown in Fig. 18, in case the

thickness of the interlayer insulating film 13 approximates in value [to] the thickness of liquid crystal layer 1, any fragments of such interlayer insulating film 13 with the drain electrode 11 of the repairing section attached thereto will hardly behave to fly out into the liquid crystal layer 1 and continue residing at the cutout portion, i.e. a repairing section, and then return to its original position due to application of vibrations and pressures thereto, which possibly results in occurrence of re-leakage of the cutout portion.

*Please replace the paragraphs beginning at page 57, line 11 through page 58, line 20, with the following rewritten paragraphs:*

It will possibly happen [when reduction to practice] that thin portions of the interlayer insulating film 13 can reside during manufacturing processes even where apparatus design does not intend to form such interlayer insulating film 13 overlying the to-be-corrected portions *a*, *b* of the drain electrode 11. However, even if this is the case, similar advantages of the liquid crystal display apparatus stated above are achievable because the interlayer insulating film 13 is thin sufficiently. Additionally, although [the] embodiment 6 has been explained under an assumption that the liquid crystal display apparatus is a reflective liquid crystal display apparatus having pixel electrodes made of reflective electrode materials, the instant invention should not be limited only to such liquid crystal display apparatus of the reflection type.

In [an] embodiment 7 an explanation will be given, with reference to Fig. 20, of a to-be-corrected portion that is formed at part of a gate electrode 5 as diverted from the scan signal transmission line 4. In [the] embodiment 7, the to-be-corrected portion is a neck portion of the gate electrode, having a width narrower than that of the other portions thereof.

Typically in a liquid crystal display apparatus of the transmission type including a TFT 7 with its gate electrode 5 diverted from its associated scan signal transmission line 4, any transparent pixel electrode 15 will not be formed in view of the fact that those regions in which a gate electrode 5's diverted or branch portion and drain electrode 11

plus source electrode are laid out (which employ no transparent electrode materials) become optically opaque regions which permit transmission of no rays of light. On the contrary, in the reflective liquid crystal display apparatus, it is possible to form the reflective pixel electrode 15 extending to overlies the upper part of the TFT 7 due to the fact that such apparatus is inherently designed to perform displaying operations by utilizing externally attendant light from the entire surface of its panel.

### **IN THE CLAIMS**

Please amend claims 1, 3 – 4, 6, 8 – 9, 11, 13, 15, and 17 as follows:

1. {ONCE AMENDED} A liquid crystal display apparatus comprising:
  - a pair of substrates disposed opposing each other;
  - a liquid crystal layer sandwiched therebetween;
  - a data signal transmission line for supplying data signals, laid out on one of the substrates;
  - a scan signal transmission line for supplying timing signals, laid out on the one of the substrates,
  - [the data signal transmission line and scan signal transmission line being arranged to intersect each other;]
  - a thin-film transistor including a gate electrode which is diverted from the scan signal transmission line, the thin-film transistor being electrically connected to the data and scan signal transmission lines;
  - an interlayer insulating film disposed so as to at least partially cover [part of] the data/scan signal transmission lines and the transistor; and
  - a pixel electrode disposed on the interlayer insulating film, the pixel electrode being electrically connected to a drain electrode of the thin film transistor via a contact hole which is provided in the interlayer insulating film,

wherein the interlayer insulating film and liquid crystal layer are disposed so as to overlie at least part of the drain electrode.

3. {ONCE AMENDED} The liquid crystal display apparatus of claim 2, wherein the opening of the pixel electrode is formed so as to contact [with] an outer periphery of the pixel electrode.

4. {ONCE AMENDED} The liquid crystal display apparatus of claim 1, wherein the drain electrode comprises a potential correction site which has a narrowed width [a to-be-corrected portion is formed in at least part of the drain electrode by narrowing the width of the electrode].

6. {ONCE AMENDED} A liquid crystal display apparatus comprising:  
a pair of substrates disposed opposing each other;  
a liquid crystal layer sandwiched therebetween;  
a data signal transmission line for supplying data signals, laid out on one of the substrates;  
a scan signal transmission line for supplying timing signals, laid out on the one of the substrates,  
[the data signal transmission line and scan signal transmission line being arranged to intersect each other;]  
a thin-film transistor including a gate electrode which is diverted from the scan signal transmission line, the thin-film transistor being electrically connected to the data and scan signal transmission lines;  
an interlayer insulating film disposed so as to at least partially cover [part of] the data/scan signal transmission lines and the transistor; and

a pixel electrode disposed on the interlayer insulating film, the pixel electrode being electrically connected to a drain electrode of the thin film transistor via a contact hole which is provided in the interlayer insulating film,

wherein the interlayer insulating film and liquid crystal layer are disposed so as to overlie at least part of the gate electrode.

8. {ONCE AMENDED} The liquid crystal display apparatus of claim 7, wherein the opening of the pixel electrode is formed so as to contact [with] an outer periphery of the pixel electrode.

9. {ONCE AMENDED} The liquid crystal display apparatus of claim 6, wherein the gate electrode comprises a potential correction site which has a narrowed width [a to-be-corrected portion is formed in at least part of the gate electrode by narrowing the width of the electrode].

11. {ONCE AMENDED} A liquid crystal display apparatus comprising:  
a pair of substrates disposed opposing each other;  
a liquid crystal layer sandwiched therebetween;  
a data signal transmission line for supplying data signals, laid out on one of the substrates;  
a scan signal transmission line for supplying timing signals, laid out on the one of the substrates;  
an auxiliary capacitance line for forming an auxiliary capacitance,  
[the data signal transmission line, scan signal transmission line and auxiliary capacitance line being arranged to intersect each other;]  
a thin-film transistor including a gate electrode which is diverted from the scan signal transmission line, the thin-film transistor being electrically connected to the data and scan signal transmission lines,



an interlayer insulating film disposed so as to at least partially cover [part of] the data/scan signal transmission lines and the transistor; and

a pixel electrode disposed on the interlayer insulating film, the pixel electrode being electrically connected to a drain electrode of the thin film transistor via a contact hole which is provided in the interlayer insulating film,

wherein the interlayer insulating film and liquid crystal layer are disposed so as to overlie at least part of a diverted portion which is diverted from the auxiliary capacitance line.

13. {ONCE AMENDED} The liquid crystal display apparatus of claim 12, wherein the opening of the pixel electrode is formed so as to contact [with] an outer periphery of the pixel electrode.

15. {ONCE AMENDED} A liquid crystal display apparatus comprising:

a pair of substrates disposed opposing each other;

a liquid crystal layer sandwiched therebetween,

a data signal transmission line for supplying data signals, laid out on one of the substrates;

a scan signal transmission line for supplying timing signals, laid out on the one of the substrates,

[the data signal transmission line and scan signal transmission line being arranged to intersect each other;]

a thin-film transistor including a gate electrode which is diverted from the scan signal transmission line, the thin-film transistor being electrically connected to the data and scan signal transmission lines;

an interlayer insulating film disposed so as to at least partially cover [part of] the data/scan signal transmission lines and the transistor; and

a pixel electrode disposed on the interlayer insulating film, the pixel electrode being electrically connected to a drain electrode of the thin film transistor via a contact hole which is provided in the interlayer insulating film,

wherein the pixel electrode is provided with an opening formed at a specified location nearest to the data signal transmission line at an outer periphery of the pixel electrode.

17. {ONCE AMENDED} A liquid crystal display apparatus comprising:

a pair of substrates opposing each other;

a liquid crystal layer sandwiched therebetween;

a data signal transmission line disposed on one of the substrates;

a switching element disposed on the one substrate;

an interlayer insulating film formed so as to at least partially cover [at least part of] the data signal transmission line and the switching element; and

a pixel electrode disposed on the interlayer insulating film;

the switching element being interposed between the data signal transmission line and the pixel electrode,

the pixel electrode being electrically connected to the switching element via a contact hole formed in the interlayer insulating film,

wherein the pixel electrode has an opening to expose a potential correction site of the liquid crystal display apparatus [is disposed in a residual region other than a region on a to-be-corrected portion when correcting pixels within parts or components disposed between the interlayer insulating film and the one substrate].